

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (currently amended) A method of controlling a storage device controlling apparatus which includes[[:]

a plurality of channel controllers having a circuit board on which are formed a file access processing section receiving requests to input and output data in files as units from an information processing apparatus via a network and an I/O processor outputting to a storage device I/O requests corresponding to said requests to input and output data; and

a disk controller executing input and output of data into and from said storage device in response to the I/O requests sent from said I/O processors, and ~~which manages~~ managing a memory area provided by said storage device in logical volumes, which are memory areas logically set on the memory area, a plurality of the same logical volumes being assigned to each of the plurality of channel controllers, said plurality of channel controllers having stored in at least one of said plurality of the same logical volumes information that is necessary for the channel controller which has not failed to take over processing of the channel controller which has failed when failure occurs.

said method comprising ~~the steps of:~~

receiving, by at least one of said channel controllers, data specifying an assignment of a logical volume to said channel controller, said data being sent from said information processing apparatus; [[and]]

storing said received assignment by said at least one channel controller; and when one of said channel controllers fails, processing a read/write request from said information processing apparatus by a channel controller which has not failed.

2. (original) A method of controlling a storage device controlling apparatus according to claim 1, wherein when receiving one of said data input and output requests, each of said at least one channel controller checks based on said stored assignment

whether or not the data input/output request is targeted at a logical volume assigned to said channel controller, and if not targeted thereat, the data input/output request is not executed.

3. (currently amended) A method of controlling a storage device controlling apparatus ~~which includes~~ according to claim 1, further comprising:

~~a plurality of channel controllers having a circuit board on which are formed a file access processing section receiving requests to input and output data in files as units from an information processing apparatus via a network and an I/O processor outputting to a storage device I/O requests corresponding to said requests to input and output data; and~~

~~a disk controller executing input and output of data into and from said storage device in response to the I/O requests sent from said I/O processors, and~~

~~which manages a memory area provided by said storage device in logical volumes, which are memory areas logically set on the memory area, said method comprising the steps of:~~

~~performing, when data is written into a first logical volume, by said disk controller a replication management process by which said data is also written into a second logical volume in order to store a copy of the data in a second logical volume;~~

~~receiving, by each of at least one of said channel controllers, correspondence between a first logical volume and a second logical volume where a copy of the first logical volume is stored, which correspondence is sent from said information processing apparatus, and notifying it to said disk controller; and~~

~~performing by said disk controller said replication management process according to said notified correspondence.~~

4. (currently amended) A method of controlling a storage device controlling apparatus ~~which includes~~ according to claim 1, further comprising:

~~a plurality of channel controllers having a circuit board on which are formed a file access processing section receiving requests to input and output data in files as units from an information processing apparatus via a network and an I/O processor outputting to a storage device I/O requests corresponding to said requests to input and output data; and~~

~~a disk controller executing input and output of data into and from said storage device in response to the I/O requests sent from said I/O processors, and~~

~~which manages a memory area provided by said storage device in logical volumes, which are memory areas logically set on the memory area, said method comprising the steps of:~~

performing, when data is written into a first logical volume, by said disk controller a remote replication management process by which said data is sent to a second logical volume provided by another storage device controlling apparatus in order to store a copy of the data in a second logical volume in said another storage device controlling apparatus;

receiving, by each of at least one of said channel controllers, correspondence between a first logical volume and a second logical volume where a copy of the first logical volume is stored, which correspondence is sent from said information processing apparatus, and notifying it to said disk controller; and

performing, by said disk controller, said remote replication management process according to said notified correspondence.

5. (currently amended) A method of controlling a storage device controlling apparatus ~~which includes~~ according to claim 1, further comprising:

~~a plurality of channel controllers having a circuit board on which are formed a file access processing section receiving requests to input and output data in files as units from an information processing apparatus via a network and an I/O processor outputting to a storage device I/O requests corresponding to said requests to input and output data; and~~

~~a disk controller executing input and output of data into and from said storage device in response to the I/O requests sent from said I/O processors; said method comprising the steps of:~~

receiving, by each of at least one of said channel controllers, setting information about backup of data stored in said storage device from said information processing apparatus; and

reading to-be-backed-up data stored in said storage device based on said setting information and sending the data to a backup device coupled to said network.

6. (original) A method of controlling a storage device controlling apparatus according to claim 5, wherein in setting information, to-be-backed-up data is specified in files or directories as units.

7. (currently amended) A method of controlling a storage device controlling apparatus ~~which includes:~~ according to claim 1,

~~a plurality of channel controllers having a circuit board on which are formed a file access processing section receiving requests to input and output data in files as units from an information processing apparatus via a network and an I/O processor outputting to a storage device I/O requests corresponding to said requests to input and output data; and a disk controller executing input and output of data into and from said storage device in response to the I/O requests sent from said I/O processor,~~

said method being for updating a program read from said storage device and executed by hardware formed on said circuit board, said method further comprising the steps of:

receiving, by each of at least one of said channel controllers, data for updating said program and sent from said information processing apparatus; and

updating, by said controlling apparatus, said program stored in said storage device according to the data for updating the program.

8. (original) A method of controlling a storage device controlling apparatus according to claim 7, wherein at least one of said channel controllers has a function as a Web server, and wherein data for updating one of said program and the contents of said non-volatile memory is sent to said at least one channel controller by use of a Web page function provided to said information processing apparatus via said network.

9. (original) A method of controlling a storage device controlling apparatus according to claim 7, wherein said program is at least one of a program for enabling an operating system executed by hardware formed on said circuit board to function and an application program operating on the operating system.

10. (currently amended) A method of controlling a storage device controlling apparatus ~~which includes~~ according to claim 1, further comprising:

~~a plurality of channel controllers implemented by, as components, a circuit board on which are formed a file access processing section receiving requests to input and output data in files as units from an information processing apparatus via a network and an I/O processor outputting to a storage device I/O requests corresponding to said requests to input and output data; and~~

~~a disk controller executing input and output of data into and from said storage device in response to the I/O requests sent from said I/O processors; said method comprising the steps of:~~

receiving, by each of at least one of said channel controllers, information specifying a second channel controller as the to-fail-over for fail-over automatically performed in association with a first channel controller's processing, said information being sent from said information processing apparatus; and

automatically performing, by said storage device controlling apparatus, fail-over from the first channel controller to the second channel controller based on said specifying information.

11. (currently amended) A storage device controlling apparatus ~~which includes comprising:~~

a plurality of channel controllers having a circuit board on which are formed a file access processing section receiving from an information processing apparatus requests to input and output data in files as units via a network and an I/O processor outputting to a storage device I/O requests corresponding to said requests to input and output data; and

a disk controller executing input and output of data into and from said storage device in response to the I/O requests sent from said I/O processors, and ~~which manages~~ managing a memory area provided by said storage device in logical volumes, which are memory areas logically set on the memory area, ~~said controlling apparatus a plurality of the same logical volumes being assigned to each of the plurality of channel controllers;~~

wherein at least one of said channel controllers comprises a section receiving data specifying an assignment of a logical volume to said channel controller, said data being sent from said information processing apparatus; and a section storing said received assignment;

wherein when one of said channel controllers fails, a read/write request from said information processing apparatus is processed by a channel controller which has not failed; and

wherein said plurality of channel controllers store, in at least one of said plurality of the same logical volumes, information that is necessary for the channel controller

which has not failed to take over processing of the channel controller which has failed when failure occurs.

12. (original) A storage device controlling apparatus according to claim 11, wherein each of said at least one channel controller comprises a section which, when receiving one of said data input and output requests, checks based on said stored assignment whether or not the data input/output request is targeted at a logical volume assigned to said channel controller, and which controls such that, if not targeted thereat, the data input/output request is not executed.

13. (currently amended) A storage device controlling apparatus according to claim 11, which includes:

~~a plurality of channel controllers having a circuit board on which are formed a file access processing section receiving from an information processing apparatus requests to input and output data in files as units via a network and an I/O processor outputting to a storage device I/O requests corresponding to said requests to input and output data; and~~

~~a disk controller executing input and output of data into and from said storage device in response to the I/O requests sent from said I/O processors, and~~

~~which manages a memory area provided by said storage device in logical volumes, which are memory areas logically set on the memory area,~~

~~said controlling apparatus wherein said disk controller comprises a section which, when data is written into a first logical volume, performs a replication management process by which said data is also written into a second logical volume in order to store a copy of the data in a second logical volume,~~

~~wherein at least one of said channel controllers comprises a section which receives correspondence between a first logical volume and a second logical volume where a copy of the first logical volume is stored, which correspondence is sent from said information processing apparatus, and which notifies it to said disk controller, and~~

~~wherein said disk controller further comprises a section which performs said replication management process according to said notified correspondence.~~

14. (currently amended) A storage device controlling apparatus according to claim 11, which includes:

~~a plurality of channel controllers having a circuit board on which are formed a file access processing section receiving from an information processing apparatus requests to input and output data in files as units via a network and an I/O processor outputting to a storage device I/O requests corresponding to said requests to input and output data; and~~

~~a disk controller executing input and output of data into and from said storage device in response to the I/O requests sent from said I/O processors, and~~

~~which manages a memory area provided by said storage device in logical volumes, which are memory areas logically set on the memory area,~~

~~said controlling apparatus wherein said disk controller comprises a section which, when data is written into a first logical volume, performs a remote replication management process by which said data is sent to a second logical volume provided by another storage device controlling apparatus in order to store a copy of the data in a second logical volume in said another storage device controlling apparatus,~~

~~wherein each of at least one of said channel controllers further comprises a section which receives correspondence between a first logical volume and a second logical volume where a copy of the first logical volume is stored, which correspondence is sent from said information processing apparatus, and notifies it to said disk controller, and~~

~~wherein said disk controller further comprises a section which performs said remote replication management process according to said notified correspondence.~~

15. (currently amended) A storage device controlling apparatus according to claim 11, which includes:

~~a plurality of channel controllers having a circuit board on which are formed a file access processing section receiving from an information processing apparatus requests to input and output data in files as units via a network and an I/O processor outputting to a storage device I/O requests corresponding to said requests to input and output data; and~~

~~a disk controller executing input and output of data into and from said storage device in response to the I/O requests sent from said I/O processors,~~

~~said controlling apparatus wherein each of at least one of said channel controllers further comprises a section which receives setting information about backup of data stored in said storage device from said information processing apparatus; and a section~~

which reads to-be-backed-up data stored in said storage device based on said setting information and sends the data to a backup device coupled to said network.

16. (original) A storage device controlling apparatus according to claim 15, wherein in setting information, to-be-backed-up data is specified in files or directories as units.

17. (currently amended) A storage device controlling apparatus according to claim 11, which includes:

~~a plurality of channel controllers having a circuit board on which are formed a file access processing section receiving from an information processing apparatus requests to input and output data in files as units via a network and an I/O processor outputting to a storage device I/O requests corresponding to said requests to input and output data; and~~

~~a disk controller executing input and output of data into and from said storage device in response to the I/O requests sent from said I/O processors,~~

said controlling apparatus being for updating a program read from said storage device and executed by hardware formed on said circuit board,

~~said controlling apparatus~~ wherein each of at least one of said channel controllers further comprises a section which receives data for updating said program and sent from said information processing apparatus, and

said controlling apparatus further comprising a section which updates said program stored in said storage device according to the data for updating the program.

18. (original) A storage device controlling apparatus according to claims 17, wherein at least one of said channel controllers has a function as a Web server, and wherein data for updating one of said program and the contents of said non-volatile memory is sent to said at least one channel controller by use of a Web page function provided to said information processing apparatus via said network.

19. (original) A storage device controlling apparatus according to claim 17, wherein said program is at least one of a program for enabling an operating system executed by hardware formed on said circuit board to function and an application program operating on the operating system.

20. (currently amended) A storage device controlling apparatus according to claim 11, which includes:

~~a plurality of channel controllers implemented by, as components, a circuit board on which are formed a file access processing section receiving from an information processing apparatus requests to input and output data in files as units via a network and an I/O processor outputting to a storage device I/O requests corresponding to said requests to input and output data; and~~

~~a disk controller executing input and output of data into and from said storage device in response to the I/O requests sent from said I/O processors;~~

~~said controlling apparatus wherein each of at least one of said channel controllers further comprises a section which receives information specifying a second channel controller as the to-fail-over for fail-over automatically performed in association with a first channel controller's processing, said information being sent from said information processing apparatus, and said controlling apparatus further comprising a section which automatically performs fail-over from the first channel controller to the second channel controller based on said specifying information.~~